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FOODPLANT ECOLOGY OF THE BUTTERFLY *CHLOSYNE LACINIA* (GEYER) (NYMPHALIDAE)

II. ADDITIONAL LARVAL FOODPLANT DATA

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Previously (Neck, 1973) I discussed the larval foodplants of *Chlosyne lacinia* var. *adjutrix* (Scudder). Included were extensive personal observations in central and south Texas in addition to previous literature records. The purpose of this publication is to update this previous communication before additional detailed studies are reported in subsequent publications. Several remarks and corrections concerning conclusions of the first paper can be made at this time. Several new foodplant records are available from personal observations. Personal observations were made in central Texas, centering within Austin, Travis County, Texas.

REMARKS ON INITIAL REPORT

Foodplants of *Chlosyne lacinia* var. *adjutrix* in central Texas were grouped according to relative importance—major, occasional and rarely utilized foodplants (see table 1). Quantitative data were not available at the time to properly rank the relative importance of the foodplants within each group, however. During 1972, a large, diverse site in the upper part of the old floodplain of the Colorado River (now impounded and re-named Town Lake) in Austin, Travis County, was monitored for foodplant utilization throughout the season (March-October). The total numbers of broods per major foodplant at this site for the entire season were as follows: *Helianthus annuus* L. — 171, *Verbesina encelioides* (Cav.) Gray — 119, and *Ambrosia trifida*

L. — 71. These three plants are in this same order in the previous publication (Neck, 1973).

The order of the occasional foodplants given in the previous paper appears to represent their relative importance. Actually, the first three species (plant #4 - #6 in table 1) are of approximately equal significance. These plants are of importance under certain seasonal and local conditions. Utilization of these three plants will be discussed in a later article in this series.

Helianthus debilis Nutt. var. *cumcumerifolius* (T. & G.) Heiser grows in sandy soils which are somewhat limited in occurrence in the Austin area as much of the alluvial areas have now been inundated as a result of multiple damming of the Colorado River. Additionally, this plant is rapidly replaced in succession by *V. encelioides,* a plant which is persistent in a particular locality from year to year. A site at which *cucumerifolius* is abundant during one season will quite likely contain no individuals of this sunflower the following season. Such succession has been observed in both the alluvial sands (Quarternary) of the Colorado River in Austin and the Carrizo Sands (Eocene) which outcrop to the east. My personal experience would classify this plant as rarely utilized. However, Kendall (1959) reported a large population of larvae of this plant. Therefore, *cucumerifolius* is best considered an occasional foodplant, but it is not utilized nearly as widely as the other three plants placed in this category.

The foodplants in group III are only rarely utilized. Many are not known to have become larval foodplants via adult female oviposition; records of several plants are known only from larvae which have crossed-over from another foodplant species. During extensive observations in 1972 only one of these plants were personally observed as a foodplant for *adjutrix.* Several larvae were found on *Heterotheca latifolia* Buck. on 27 June 1972. These larvae, however, had crossed-over from *H. annuus;* oviposition by wild females on this plant is still unknown (see Neck, 1973).

A single final instar larva of *adjutrix* was found on *Calyptocarpus vialis* Less. by R. O. Kendall (pers. comm. 16 Sept. 1972) west of San Antonio in Bexar County. This larva probably crossed-over from *H. annuus* on which a brood was observed in the same general area. Later, I found a single larva on *C. vialis* in Austin in an area devoid of other suitable foodplants. These two additional examples (see first in Neck, 1973) indicate that *C. vialis* is an acceptable but little utilized foodplant.

Previous mention was made of the apparent unsuitability of commercial monocephalic varieties of sunflowers for proper development of *adjutrix* larvae. A recent study of cultivated sunflower plots (Phillips et al., 1973) revealed a peak abundance of 1980 larvae per acre (with 40,000 plants/acre). This figure is only one larva for each 20.2 plants and would involve no more than three to seven egg masses. Of all lepidopteran species collected, *adjutrix* was the least abundant and was not discussed within the text of the report. This unsuitability of a cultivated form when compared to a wild weedy form is opposite that reported for *Papilio polyxenes* (Erickson, 1975).

The "rarely utilized foodplant" initially reported as "*Silphuim* sp." (Neck, 1973) has been identified as *Silphium asperrimum* Hook. (see table 1).

Several publications were omitted from the "Literature Cited" section of the previous paper, i.e. Dethier, 1959; Kendall, 1964; Remington, 1952; Remington and Pease, 1955; Straatman, 1962. These articles are listed in the bibliography at the end of this publication.

NEW LARVAL FOODPLANTS

Four additional plant species are now known to be larval foodplants for *adjutrix*.

R. O. Kendall (pers. comm.) found larvae on *Silphium albiflorum* Gray on 4 April 1968 in Terrell County (14 km W. of Dryden), Texas.

On 20 August 1973 a larval brood was observed feeding on garden grown specimens of the native *Helianthus maximiliani* Schrad. in downtown Austin (two blocks from the state capitol building). Previous years of observation of this plant under natural conditions had revealed no larval infestations. Utilization of these plants apparently resulted from lack of suitable foodplants in an urban environment. Additionally, other foodplants in natural habitats at this time were in dessicated condition due to summer drought; *H. annuus* plants were in poor shape and *V. encelioides* had not yet become lush as yet due to lack of rain.

Infestation of Jerusalem artichoke, *Helianthus tuberosus* L., has been observed in a residential area of Austin. Larvae of two generations (15 June and 14 July 1975) were found on several plants. Other *adjutrix* larvae were located on *H. annuus* concurrently with both instances of *H. tuberosus* infestations (only

ten meters separated the two sites). *H. tuberosus* plants, however, were downwind and visually screened (by an eight-foot privacy fence) from the *H. annuus* plants. Oviposition on *H. tuberosus* by *adjutrix* occurred as the result of "random" flight by *adjutrix* females rather than a directed attraction away from the *H. annuus*. Of further interest was the absence of any *adjutrix* larvae on numerous individuals of *H. maximiliani* which were also present in the same yard as the *H. tuberosus*.

H. tuberosus is not native to the Austin area. The nearest native occurrence is in north Texas some 400 kilometers NNE of the Austin area. In a study of *Chlosyne gorgone* (Hüber) in Kansas, O. R. Taylor (personal communication) found that *H. tuberosus* was the third most frequently utilized larvae foodplant (after *H. annuus* and *A. trifida*). Possibly, *H. tuberosus* would be a significant larval foodplant of *adjutrix* if it occurred naturally within the resident geographical range of *adjutrix*. Both *tuberosus* and *maximiliani* are members of the section Divaricati, *maximiliani* in Gigantei (see Heiser et al 1969).

H. petiolaris is a member of the section Annui which includes the previously reported foodplants *annuus, argophyllous* and *cucumerifolius* (Heiser et al, 1969). Members of this section appear to be particularly suitable for *adjutrix* larvae although no adult oviposition has been observed on *H. argophyllous*. The highly pubescent nature of the leaf surfaces of *H. argophyllous* may not provide sufficient ovipositional cues despite the presumed phytochemical resemblance to other related species of *Helianthus*, especially *H. annuus*.

ADDITIONAL LITERATURE RECORDS

Several additional literature records of larval foodplants of *adjutrix* have been located (references from California to extreme western Texas refer to the subspecific taxon *crocale* Edwards). Larvae were reported on *Xanthium strumarium* L. (as *X. canadense* Mill.) around Blythe, California (Comstock and Dammers, 1935). Later, Comstock (1946) reported larvae "may be found in the fall throughout the Imperial and Coachella Valleys" on *H. annuus*. Cockerell (1941) reported that "larvae abound on sunflowers" (*H. annuus*) in southern New Mexico and northern Mexico.

Bauer (1975) reported that larvae feed on *Grindelia microcephala* DC. This record originated from an observation by R. O. Kendall (personal communication). Kendall (in litt.) has

informed me that this report is unverified; thus, this species is not accepted as a valid foodplant record at this time. *G. microcephala* is a member of the tribe Astereae (same as *Heterotheca* which is known as *adjutrix* foodplant only by cross-over larvae); therefore, *G. microcephala* is unlikely to be a widely-used foodplant of *adjutrix*.

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TABLE 1.

Larval foodplants of *Chlosyne lacinia* var. *adjutrix* (Scudder) in central Texas with additional data not reported in Neck (1973); Nomenclature from Correll and Johnston (1970).

I. Major Foodplants

1. *Helianthus annuus* L.
2. *Verbesina encelioides* (Cav.) Gray
3. *Ambrosia trifida* L.

II. Occasional Foodplants

4. *Verbesina virginica* L.
5. *Viguiera dentata* (lav.) Spreng.
6. *Helianthus debilis* Nutt. var. *cucumerifolius* (T. & G.) Heiser

III. Rarely Utilized Foodplants

8. *Ambrosia artemesiifolia* L.
9. *Parthenium hysterophorous* L.
10. *Helianthus argophyllous* L.
11. *Xanthium strumarium* L.
12. *Simsia calva* (E. & G.) Gray
13. *Calyptocarpus vialis* Less.
14. *Silphium asperrimum* Hook.
15. *Gaillardia pulchella* Foug.
16. *Heterotheca latifolia* Buck.
17. *Helianthus maximiliani* Schrad.
18. *Helianthus tuberosus* L.